

Remarks

Reconsideration and reexamination of the above-identified patent application, as amended, are respectfully requested. Claims 1-3, 5, and 7-9 are pending in this application upon entry of this Amendment. In this Amendment, the Applicant has amended claim 1; and cancelled claims 4 and 6. No claims have been added in this Amendment. Of the pending claims, claim 1 is the only independent claim.

Claim Rejections - 35 U.S.C. § 103

In the Office Action mailed June 3, 2004, the Examiner rejected claims 1-9 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 2,403,952 issued to Ruge (“Ruge”) in view of U.S. Patent No. 6,402,196 issued to Nicot (“Nicot”). The Applicant believes that the claimed invention is patentable under 35 U.S.C. § 103(a) over any combination of Ruge and Nicot and has amended independent claim 1 to more clearly define thereover.

1. The Claimed Invention

The claimed invention, as recited in amended independent claim 1, is a torsion module of a torque detection device for a steering system of a motor vehicle. The torsion module generally includes a spoked wheel, first and second rings, and a measuring sensor.

The wheel has bending spokes which connect a rim to a hub. The bending spokes are bendable to enable the rim to rotate relative to the hub. The first ring is attachable to a steering wheel. The first ring is attached directly to a top side of the rim such that the first ring is integral with the rim and rotates with the rim relative to the hub in response to a torque applied to the steering wheel. The second ring is attached directly to a bottom side of the rim such that the second ring is integral with the rim and rotates with the rim relative to the hub in response to a torque applied to the steering wheel. The first and second rings are void of

any direct connection to the hub and are indirectly connected to the hub by the rim and the bending spokes.

The sensor is placed on a bending spoke. The sensor generates a signal as a function of a bending force experienced by the bending spoke as the bending spoke bends in response to a rotation angle offset between the hub and the rim as the rim rotates relative to the hub in response to a torque applied to the steering wheel.

The wheel further includes bending-resistant limit stop spokes placed alternately between the bending spokes. Each bending-resistant limit stop spoke has a free end protruding radially from the hub towards the rim. The free ends are engaged with respective regions of the rim in such a manner as to permit a rotational angle offset between the hub and the rim for the rim to rotate relative to the hub while limiting the maximum rotation angle offset between the hub and the rim.

The hub, the rim, the bending spokes, and the bending-resistant limit stop spokes wheel are concentric to one another. The rim and the bending-resistant limit stop spokes are placed such that they are located in one plane and have the same extent in the axial direction.

The rings have inward-pointing projections adjacent to the regions of the rim engaged with the bending-resistant limit stop spokes to form axially separated limit stops which enclose the free ends of the bending-resistant limit stop spokes on the top and bottom sides of the rim in order to prevent axial movement between the hub and the rim.

2. Ruge and Nicot

The Examiner posited that Ruge teaches the claimed invention with the exception of a "first" ring attachable to a steering wheel. The Examiner posited that Nicot teaches a first ring (14a) attachable to a steering wheel (5) (FIG. 2).

3. The Claimed Invention Compared to Ruge and Nicot

The claimed invention generally differs from any combination of Ruge and Nicot in that the claimed invention includes first and second rings which are respectively attached directly to the rim to be integral with the top and bottom sides of the rim and to rotate with the rim relative to the hub with the first ring being attachable to a steering wheel. The first and second rings are void of any direct connection to the hub and are indirectly connected to the hub by the rim and the bending spokes. The first and second rings include inwardly-pointing projections adjacent to the regions of the rim engaged with the bending-resistant limit stop spokes to form axially separated limit stops which enclose the free ends of the bending-resistant limit stop spokes on the top and bottom sides of the rim in order to prevent axial movement between the hub and the rim.

Ruge teaches a disc (19) which is held to the hub (1) by screws (14). As such, it does not appear that disc (19) is configured to rotate with the rim (2) relative to the hub (1) nor does it appear that disc (19) is attached to the rim to be integral with the rim. (See FIG. 1; and col. 2, lines 30-49 of Ruge.) Nicot teaches a first ring 14a connected to the hub (25) by non-deformable beams (19). (See FIGS. 2-3 of Nicot.)

Therefore, neither Ruge nor Nicot, alone or in combination, teach or suggest first and second rings which are attached to the rim to rotate with the rim relative to the hub in which the rings are indirectly connected to the hub by the rim and include projections which form axially separated limit stops for enclosing bending-resistant limit stop spokes in order to prevent axial movement between the hub and the rim.

Accordingly, the Applicant believes that amended independent claim 1 is patentable under 35 U.S.C. § 103(a) over Ruge and Nicot. Claims 2-3, 5, and 7-9 depend from amended independent claim 1 and include the limitations therein. Therefore, the Applicant respectfully requests reconsideration and withdraw of the rejection to claims 1-3, 5, and 7-9 under 35 U.S.C. § 103(a).

CONCLUSION

In summary, claims 1-3, 5, and 7-9, as amended, meet the substantive requirements for patentability. The case is in appropriate condition for allowance. Accordingly, such action is respectfully requested.

If a telephone or video conference would expedite allowance or resolve any further questions, such a conference is invited at the convenience of the Examiner.

Respectfully submitted,
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Date: June 8, 2004

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